

Part V Land Treatment of Waste Products

162.0 Scope

- 162.1 This document provides regulations for all people engaged in the handling, marketing or agricultural utilization of non-hazardous waste products generated by industrial or commercial activities which will be utilized in agricultural or horticultural setting as a fertilizer or soil amendment agent. Materials subject to regulations under RCRA, TOSCA or other federal or state regulatory programs governing hazardous wastes are not included in the scope of these regulations. Nor do manures, waste vegetables or other materials produced under agricultural settings, or products of materials currently regulated or managed by the Delaware Department of Agriculture for use by farmers in agricultural activities.
- 162.2 The Delaware Department of Natural Resources and Environmental Control encourages the reuse or utilization of waste products as a viable alternative to disposal or incineration where appropriate. The regulations outlined herein apply to waste products that, because of their physical, chemical or biological characterization, may be used as soil conditioners or as substitutes to commercial fertilizers in agricultural settings.

163.0 Definitions – The following terms have the meanings indicated.

“Agricultural land” means land cultivated for the production of crops or used for raising livestock.

“Agricultural utilization” means the application rate of wastes products which shall not exceed nutrient needs of the crop grown on the particular soil plus the other assimilative pathways in soils (e.g. immobilization with organic material, volatilization, and leachate in compliance with drinking water standards). The department may require a lower application rate if the design criteria for pathogens, metals or organics contained in these Regulations plus generally accepted technical standards for land treatment technology (e.g. U.S. EPA Process Design Manuals or Overcash, M.R. and P. Pal. 1979 Design of Land Treatment Systems for Industrial Wastes – Theory and Practice) cannot be achieved at the above application rate. This term may be used interchangeably with **“agronomic rate”**.

“Agricultural wastes” means wastes normally associated with the production and processing of food and fiber on farms, feedlots, ranches, ranges and forests which may include animal manure, crop residues and dead animals; also agricultural chemicals, fertilizers and pesticides which may find their way into surface and subsurface and subsurface water.

“Collection” means any action involved in the gathering or subsequent placement of waste products into a vehicle, container or any other vessel for transportation to some other location.

“Crops for direct human consumption” means crops that are consumed by humans without processing to minimize pathogens before distribution to the consumer.

“Department” means the Department of Natural Resources and Environmental Control.

“Disposal” means the discharge, deposit, injection, dumping, spilling, leaking or placing of waste products on or in the land, the air or any waters, including ground water and includes any method of waste products utilization that involves reuse of nutrients in the waste product at greater than agronomic rates.

“Distribute” means to barter, sell, offer for sale, consign, furnish, provide or otherwise supply a material as part of a commercial enterprise or a giveaway program.

“Food chain crops” means tobacco, crops grown for human consumption and crops grown to feed animals whose products are consumed by humans.

“Handling” means any way in which waste products are dealt with, other than collection, burning, storage, treatment, land application, disposal or transportation. It includes distribution of waste products.

“Household waste” means waste derived from households (including single and multiple residences, hotels and motels, bunkhouses, ranger stations, crew quarters, campgrounds and day-use recreation areas) which is not sewage or septage.

“Impermeable” means having a hydraulic conductivity equal to or less than 1×10^{-7} cm/sec as determined by field and laboratory permeability tests made according to standard test methods which may be correlated with soil densification as determined by compaction tests.

“Label” means the display of all written, printed or graphic material on the immediate container or information accompanying the material.

“Land application” means the placement of waste products within 2 feet below the surface of land used to support vegetative growth.

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“**Land reclamation**” means the application of waste products at a rate not greater than necessary to support and maintain immediate revegetation. Application may be in multiple cycles prior to establishment of vegetation, but must be accomplished within a single short-term operational period.

“**Land treatment**” means a technology for the intimate mixing or dispersion of wastes into the upper zone of the plant-soil system with the objective of microbial stabilization, immobilization, selective dispersion, or crop recovery leading to an environmentally acceptable assimilation of the waste.

“**Liquid waste**” means any waste which is not a solid waste as defined for the purposes of these regulations.

“**Person**” means an individual, trust, firm, joint stock company, federal agency, corporation (including a government corporation), partnership, association, state, municipality, commission, political subdivision of a state, or any interstate body.

“**Solid waste**” means any garbage, refuse, rubbish and other discarded materials resulting from industrial, commercial, mining, agricultural operations and from community activities which does not contain free liquids. Containers holding free liquids shall be considered solid waste when the container is designed to hold free liquids for use other than storage (e.g. radiators, batteries, transformers) or the waste is household waste.

“**Usable waste product**” means an industrial waste that the Department has approved as a product or feedstock for a specified use.

164.0 Waste Product characterization

Any person seeking authorization to utilize a by-product under this part shall be required to characterize the source and constituent make-up of the waste product.

165.0 Source Characterization

165.1 The applicant shall describe fully the process or systems that generate the waste product. At a minimum, the following information shall be submitted in characterizing the source of the waste product:

165.1.1 A process flow chart which identifies and explains each phase of the waste product generation process;

165.1.2 A description of all major equipment and components used in the process that generates the waste product;

165.1.3 A description of any stabilization or treatment process the waste product will undergo prior to final utilization, including (where applicable):

165.1.3.1 A description of all major equipment used in the stabilization or treatment process;

165.1.3.2 Location and type of all monitoring worksheets used in monitoring the stabilization or treatment process;

165.1.3.3 Contingency or emergency operating plans; and

165.1.3.4 Other relevant information requested by the Department.

165.2 The applicant shall provide an estimate of the quantity of the waste product that is currently being produced and the anticipated quantity to be generated annually for utilization.

165.3 Waste products containing pathogenic agents shall be stabilized in accordance with a process cited in Part III, B, Section 600 of these regulations.

166.0 Constituent Characterization

166.1 Waste products to be utilized in land application projects may range from relatively clean by-products such as those from certain food processing industries to those which are potentially toxic above certain threshold limits and would require special considerations. As such it is important that the composition of the waste product be determined.

The degree of analysis required is dependent on the ability of the applicant to identify the composition of the waste product. By-products whose composition can be clearly determined through source identification may only need to be analyzed for nutrient status, providing it can be shown that the constituents identified in Part III, B, Subsection 117.2 of these regulations are either absent or at low enough concentrations that they pose no significant environmental or public health risks. However, waste products whose composition is difficult to consistently ascertain will be required to be analyzed for the constituents cited in Part III, B, Subsection 402 (2) (168.0) of these regulations.

166.2 The waste product generator shall submit to the Department a chemical analysis of the waste product in accordance with Part III, B, Subsection 402 (2) (168.0) of these regulations every three months following permit issuance for 402 (2) (b) (168.0) unless the Department approves a different schedule in the permit. The parameters for analysis will be developed based upon the critical or controlling constituents determined through the characterization of the by-product.

- 166.3 In no case shall the cumulative metals loadings exceed the levels set forth in Part III, A, Table 2 of these regulations. The applicant shall utilize table 2 in conjunction with Section 500 to calculate the potential site life for the constitute metals.
- 166.4 The waste product generator shall perform and submit to the Department and landowner additional analyses if there has been a significant change (greater than 25%) in the quality of the waste product from the original characterization.

167.0 Utilization Method

168.0 Waste Management Plan

- 168.1 An application for a permit to utilize a waste product for agricultural purposes or in a distribution and marketing program shall include a Waste Management Plan for Department review and approval. The Waste Management Plan shall, at a minimum, provide:
- 168.2 An explanation of how the waste product will be utilized; i.e. whether the proposed operation is for agricultural utilization, distribution and marketing, research, or land reclamation.
- 168.3 An operation plan to include proposed application rates and identification of land limiting constituents (LLC); the proposed life of the operation; equipment to be used for site preparation, land application and incorporation of the waste (if applicable); storage practices and specifications including storage volume, holding time, runoff/runoff control and site access control; and other relevant information requested by the Department.

169.0 Product Literature

The applicant shall develop a printed handout for the waste product that provides instructions for the proper use of the waste product. It shall identify the source and make-up of the waste product and provide detailed instructions for its proper use on different plant types, soils, and slopes, maximum loading rates for specified uses, any unacceptable use of the material and shall provide information on essential plant nutrient content. The printed handout shall also provide information on essential plant nutrient content. The printed handout shall also provide information on essential plant nutrient content, address maximum cumulative loading rates (if contaminant concentrations are of concern), provide instructions for proper storage, stockpiling and transportation of the waste product and application methods to be employed. The Department may require that specific restrictions, warnings or a caution statement be included in the hand out.

170.0 Quality Assurance / Quality Control (QA/QC) Plan

The applicant shall develop a QA/QC plan for department review and approval to assure that the consistency of the waste product is maintained. If the waste product is to be stabilized or other wise processed, the process shall be routinely monitored and the information recorded on a form approved by the Department. The QA/QC plan shall provide in detail, measures taken to assure product uniformity and consistency. In addition, the QA/QC plan shall include a waste product sampling plan in accordance with Part III, B, Section 1200 of these regulations.

171.0 Recordkeeping and Reporting

The applicant shall develop a recordkeeping and reporting system for department review and approval which at a minimum, provides for maintaining distribution records, application rates, results of all tests performed as part of the QA/QC plan, procedures for monitoring the stabilization process (if applicable) and procedures for reporting this information to the Department.

172.0 Additional Requirements

- 172.1 Agricultural Utilization. If the applicant proposes to repeatedly (more than two consecutive years) utilize the waste product at a specific agricultural site, the following additional information shall be submitted:
 - 172.1.1 A topographic map or other map on a scale no less than 1" = 400'. The map shall include the following information:
 - 172.1.2 The boundaries of the land where the waste product will be applied, including total acreage available for utilization;
 - 172.1.3 The location of any watercourses, drainage structures or wetlands within 1000' of the proposed site;
 - 172.1.4 Residences and habitable structures within 1000' of the proposed site;
 - 172.1.5 Flood elevations;
 - 172.1.6 A description of the soil characteristics of the site in accordance with Part III, B, Subsection 402 (3) (a), (b), (c), of these regulations; and
 - 172.1.7 On-Site storage facility specifications (if applicable).
- 172.2 A Vegetable Management Plan which shall include, at a minimum, the following information:

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- 172.2.1 A projected crop rotation plan which shall specify crops to be grown, anticipated yield, fertilizer requirements, planting and harvesting schedules, timing of application of the waste product, application rate of the waste product and final use of the crop;
 - 172.2.2 The method and frequency for applying the waste product to the site and the method of incorporating the waste product to the site, if applicable;
 - 172.2.3 The total volume of waste product to be applied to the site and the proposed life of the operation;
 - 172.2.4 Methods to manage runoff and control erosion during the life of the project; and
 - 172.2.5 If the waste product is to be applied to land owned by persons other than the generator of the waste product, the name and address of the landowner and evidence that the landowner has reviewed and approved by the project.
- 172.3 Distribution and Marketing. If the applicant proposes to utilize the waste product in a Distribution and Marketing program, the following additional information shall be submitted.
- 172.3.1 Evidence that pathogenic organisms are absent from the waste product;
 - 172.3.2 Evidence that the waste product is dried or otherwise amended to a minimum of twenty percent (20%) solids prior to distribution and marketing;
 - 172.3.3 Evidence that the waste product contains no Free Liquids;
 - 172.3.4 Evidence that the waste product does not exceed the limitations for heavy metals and other constituents as established in Part III, B, Subsection 156.1.2 of these regulations;
 - 172.3.5 Evidence that there is a market for the waste material; and
 - 172.3.6 A description of the distribution and marketing system to include an identification of the end-users and the final use of the waste product.
- 172.4 Land Reclamation. In addition to the requirements cited in this part, each application for a permit to utilize a waste product for land reclamation shall adhere to the requirements of Part III, B, Subsection 138.0 of these regulations.

173.0 Storage

Storage facilities shall be designed and constructed in accordance with Part III, B, Section 145.0 of these regulations unless the applicant can demonstrate that the proposed storage practices for the waste product will not allow contaminants to leach into the groundwater, contribute to surface runoff, attract vectors, or create nuisance conditions and odors.

DIVISION OF WATER
Ground Water Discharges Section**7103 Guidance and Regulations Governing the Land Treatment of Wastes****August, 1988****Amended, June, 1994****Amended, October, 1999****Foreword**

Statewide regulations governing the land treatment of wastes have existed since 1974. The State's efforts to improve water quality through the collection and centralized treatment of wastewaters have resulted in the rehabilitation of existing treatment works and the construction of new facilities. These facilities generally utilize biological processes to treat the wastewaters from residences, commercial establishments, and industry. In addition to providing the required treatment, sludges are generated. This residual material is a slurry of water and solids that can be 100 times more concentrated than untreated wastewater. Inadequate treatment of sludge and poor operation and maintenance practices have resulted in the contamination of the state's groundwaters and presented a threat to the public health, safety and welfare.

Animal manures tonnage in the range of 600-800 thousand are produced annually in the State. Enough manure is produced to supply all the nitrogen for all the corn grown in Delaware. Over application, improper storage and timing of manure applications have contributed to contamination of both surface and groundwaters in the State. When properly managed, animal manures can provide substantial benefits to the agricultural community with minimal impacts on public health, safety, and welfare.

The purpose of this document is to prevent the problems listed above. The guidance and regulations are based upon the best information available. They provide the waste management actions necessary to achieve U.S. Environmental Protection Agency Drinking Water Standards on an average annual basis. This conforms with the State policy which was recommended to the Department and adopted from the 1983 Final Report of the Comprehensive Water Resources Management Committee.

All options for use and disposal of these waste materials have costs, benefits, and risks. The Department believes that guidance and regulations are the best way to promote good practices for utilization and disposal that minimize the potential adverse impacts on public health and the environment and maximize the potential benefits. The benefits potentially gained through waste utilization include energy and nutrient recovery, soil improvement, and the conservation of valuable natural resources.

Part I. Policies and Procedures for Land Treatment of Wastes**1.0 Introduction**

- 1.1 The attainment of water quality goals in the face of economic uncertainties, reduced government subsidies, and rising construction costs imposes a heavy responsibility on public officials, industrial personnel, and consulting engineers. It is not enough to provide facilities that will meet effluent and ambient water quality standards; a rigorous search for least-cost solutions to water quality problems is also needed. Project designs should minimize capital and operational costs when compared to other alternatives for the entire life of the project.
- 1.2 Land treatment of wastewaters, sludges and other residual wastes is a proven and cost-effective alternative to traditional technology over a wide range of circumstances where the necessary land is available at reasonable cost. For effluents and sludges, it is particularly attractive at locations where the design flow of receiving waters is low, waste treatment requirements are high and suitability of landfills is low. The full advantages of land treatment will not be realized, however, unless there is a concerted effort to focus the designs on essential features. Groundwater quality and public health must be protected, but treatment hardware and operational criteria should be based on firm evidence of need. Lined earthen lagoons should be used whenever possible and concrete, steel, and firm-set structures limited except where fully justified. All persons involved in the planning, review, and supervisory processes should take steps to assure that these objectives are realized.